CLAIMS:

1. An exhaust system for a lean-burn internal combustion engine, which system comprising a nitrogen oxide (NO_x) absorbent, a catalyst for catalysing the selective catalytic reduction (SCR) of NO_x with a NO_x-specific reactant, first means for introducing a NO_x-specific reactant or a precursor thereof into an exhaust gas upstream of the SCR catalyst and means for controlling the introduction of the NO_x-specific reactant or precursor thereof into the exhaust gas via the first introducing means, wherein the SCR catalyst is disposed upstream of the NO_x absorbent and optionally with the NO_x absorbent, wherein the control means is arranged to introduce the NO_x-specific reactant or the precursor thereof to exhaust gas via the first introducing means only when the SCR catalyst is active, whereby exhaustion of NO_x-specific reactant to atmosphere is substantially prevented.

2. An exhaust system according to claim 1, wherein the SCR catalyst activity is determined by its temperature.

3. An exhaust system according to claim 2, wherein the control means introduces the NO_x-specific reactant or the precursor thereof, when the SCR catalyst is above a first pre-determined temperature.

4. An exhaust system according to claim 1, 2 or 3, wherein the control means is arranged to interrupt the supply of the NO_x-specific reactant or the precursor thereof to the exhaust gas when the SCR catalyst is hot enough to oxidise NO_x-specific reactant to NO.

5. An exhaust system according to claim 1, wherein the supply of NO_x-specific reactant or the precursor thereof is interrupted when the SCR catalyst is above a second pre-determined temperature.

6. An exhaust system according to any of claims 1 to 5, comprising a second means for introducing the NO_x-specific reactant or the precursor thereof, which second introducing means is disposed upstream of the NO_x absorbent and downstream of the SCR catalyst.

7. An exhaust system according to claim 6, wherein the control means is arranged to supply the NO_x-specific reactant or the precursor thereof to the exhaust gas only when the NO_x absorbent is above a temperature at which NO_x regeneration is effective.

8. An exhaust system according to claim 7, wherein the temperature at which NO_x regeneration is effective is a third pre-determined temperature.

9. An exhaust system according to claim 7 or 8, wherein the control means is arranged to interrupt the supply of the NO_x-specific reactant or the precursor thereof to the exhaust gas when the NO_x absorbent is above a temperature at which NO_x storage is effectively thermally limited.

10. An exhaust system according to claim 9, wherein the temperature at which NO_x storage is effectively thermally limited is a fourth pre-determined temperature.

11. An exhaust system according to claim 3, wherein the first pre-determined temperature is from 100-600°C, preferably 150-500°C and most preferably 200-450°C.

12. An exhaust system according to claim 5, wherein the second pre-determined temperature is from 450-900°C, preferably 550-800°C and most preferably 650-700°C.

13. An exhaust system according to claim 8 or 11, wherein the third pre-determined temperature is from 75-200°C, preferably 100-175°C and most preferably 125-600°C.

14. An exhaust system according to any claim 13, wherein the first pre-determined temperature is the same as the third pre-determined temperature.

15. An exhaust system according to claim 10, wherein the fourth pre-determined temperature is from 350-600°C, preferably 400-550°C and most preferably 450-500°C.

16. An exhaust system according to any preceding claim comprising a catalyst for oxidising NO in the exhaust gas to NO_2 and a filter for collecting particulate matter in the exhaust gas for combustion in the NO_2 at up to 400°C.

17. An exhaust system according to claim 16, wherein the filter is upstream of the SCR catalyst.

18. An exhaust system according to claim 16, wherein the SCR catalyst is disposed on the filter.

19. An exhaust system according to claim 16 or 18, wherein the NO_x absorbent is disposed on the filter.

20. An exhaust system according to any preceding claim, further comprising a second SCR catalyst disposed downstream of the NO_x absorbent.

21. An exhaust system according to any preceding claim, including at least one sensor for detecting a concentration of the NO_x-specific reactant or the precursor thereof in the exhaust gas positioned downstream of the SCR catalyst.

22. An exhaust system according to any preceding claim, including at least one sensor for detecting a concentration of the NO_x specific reactant or the precursor thereof in the exhaust gas positioned downstream of the NO_x absorbent.

23. An exhaust system according to claim 21 or 22, wherein the control means regulates the supply of the NO_x-specific reactant or the precursor thereof in response to the detected concentration of the NO_x-specific reactant or the precursor thereof in the exhaust gas, thereby to reduce slip of the NO_x-specific reactant or the precursor thereof.

24. An exhaust system according to any preceding claim, wherein the control means regulates the supply of the NO_x-specific reactant or the precursor thereof in response to exhaust gas temperature.

25. An exhaust system according to any preceding claim, wherein the control means regulates the supply of the NO_x-specific reactant or the precurser thereof in response to pre-determined setting in an engine speed/load map.

26. An exhaust system according to any preceding claim, wherein the control means is arranged to supply the NO_x-specific reactant or the precursor thereof intermittently and at "spike" concentration.

27. An exhaust system according to claim 26, wherein each period between supply of the NO_x specific reactant or precursor thereof is selected from the range from 1 second to 10 minutes.

28. A lean-burn internal combustion engine including an exhaust system according to any preceding claim.

29. An engine according to claim 28, wherein it is a diesel engine or a gasoline engine.

30. A process for treating NO_x in an exhaust gas from a lean-burn internal combustion engine, which engine including an exhaust system comprising a nitrogen oxide (NO_x) absorbent and a catalyst for catalysing the selective catalytic reduction (SCR) of NO_x with a NO_x-specific reactant wherein the SCR catalyst is disposed upstream of the NO_x absorbent and optionally with the NO_x absorbent, which process comprising, when the SCR catalyst is inactive, contacting the NO_x absorbent with insufficient NO_x-specific reactant to completely reduce the total NO_x stored on the NO_x absorbent, thereby to regenerate it, and, when the SCR catalyst is active, contacting it with sufficient NO_x-specific reactant to reduce NO_x in the exhaust gas to N_2, whereby exhaustion of NO_x-specific reactant to atmosphere is substantially prevented.

31. A process according to claim 30, wherein SCR catalyst activity is determined by its temperature relative to a first predetermined temperature.

32. A process according to claim 30 or 31, wherein the NO_x-specific reactant for contacting the NO_x absorbent when the SCR catalyst is inactive does not contact said catalyst.

33. A process according to claim 30, 31 or 32, wherein, when said SCR catalyst is active, sufficient NO_x-specific reactant contacts the SCR catalyst to reduce NO_x in the exhaust

gas to N_2 and slips past the SCR catalyst to contact the NO_x absorbent thereby to reduce stored NO_x, which process is controlled so that the slipped NO_x-specific reactant is insufficient to completely reduce the total NO_x stored.

34. An exhaust system according to claim 31, wherein the first pre-determined temperature is from 100-600°C, preferably 150-500°C and most preferably 200-450°C.

35. A process according to any of claims 30 to 34, wherein at the end of regeneration, the NO_x absorbent contains 5 to 50% of the content of NO_x present at the start of regeneration.

36. A process according to any of claims 30 to 35, wherein regeneration is started when the absorbent contains 5 to 50% of the NO_x content at which NO_x slip takes place.

37. A process according to any of claims 30 to 36, wherein regeneration is controlled to stop at one of the following points:
when NO_x-specific reactant is detected at a point part-way along the length of a substrate carrying the NO_x absorbent;
in a system having two substrates carrying the solid absorbent in series, when NO_x-specific reactant is detected at a point between the substrates;
when a level of NO_x content prescribed on the basis of pre-determined data in an engine speed/load map has been reached;
when a level of NO_x content established iteratively from an initial observation of NO_x-specific reactant slip has been reached.

38. A process according to any of claims 30 to 37, wherein the time period of absorption and/or regeneration is in the range of from 1 second to 10 minutes.

39. A process according to any of claims 30 to 38, wherein the NO_x absorbent is supported on a first substrate and the SCR catalyst is supported on a second substrate.

40. A process according to any of claims 30 to 39, wherein the NO_x specific reactant is produced *in situ* from a precursor thereof.

41. A process according to claim 40, further including a step of catalytically reacting the precursor to provide NO_x specific reactant.

42. A process according to any of claims 30 to 41, wherein the starting gas is the exhaust of a lean-burn, especially diesel, internal combustion engine.